HEALTH INFORMATION MEDIA USED BY BABY BOOMERS IN TAIWAN

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ABSTRACT

Preventive health care information (PHCI) is available from multiple sources both in the United States and internationally. There have been a multitude of studies published about the nature of health seeking behaviors for those in the US. This paper analyzes a survey of 390 baby boomer respondents in Taiwan, a country whose life expectancy is very similar to the US, but one where their health care insurance program has been enacted for a longer period of time. According to this study, four different types of PHCI were identified, printed materials, internet, employer provided information, and mass media, i.e., TV, newspaper, and radio. Six different demographic and socio-economic factors were examined with these four component factor variables (CFV's). Results of this study will provide some policy applications to researchers and government in Taiwan. Some lessons can also be learned for US, especially when we have a comprehensive health insurance plan. The predicted increased demand on medical appointments has been realized in this country and the health seeking behavior of this demographic remains consistent with previous results in the US. One potential to offset the onslaught of demand on our medical system is to increase the health of the US through PHCI but to do this, we must get it in the hands of the consumer. This research focused in Taiwan will provide some insights to both people in Taiwan as well as in the US regarding PHCI.

Keywords: PHCI, Health Information Media, Baby Boomers, Taiwan

INTRODUCTION

There is a plethora of ongoing longitudinal research by the Pew Research Center (Fox, 2011; Fox, 2013; Fox, 2014; Fox & Jones, 2009; Fox & Rainee, 2000) and other sources showing that Americans are taking better care of themselves (Dutta-Bergman, 2005). This wellness movement is also finding its way into corporate America as many employers are supporting their employees taking care of their wellness. This is primarily due to the direct relationship to a cost savings by decreasing absenteeism (being absent) and presenteeism (being present) (Anderko et al., 2012; Jenkins, 2005). Wellness and preventive health care (PHC) can be directly related to each other if one perceives that they have the ability to control their physical well-being (Plank & Gould, 1990), prolong one's healthy life or lessen the effects of illness, disease or ailments (Jayanti & Burns, 1998). If they do not, then they won't act on it. It is this action and intention to control their well-

being which results from both an awareness and the efforts a person undertakes to preserve their physical, mental and emotional health today and into the future which constitutes PHC. It includes everything from healthy activity, avoiding unhealthy behaviors, using over the counter products and medical testing (Cangelosi & Markham, 1994; Cangelosi, Ranelli, & Kim, 2010a).

It is not only an employer driven movement, but society views PHC as an ever increasing need. Consumers' concerns are not only financial (as it can reduce medical expenses and increase wages by decreasing absenteeism) but consumers are increasingly finding more problems obtaining timely appointments with their doctors and limited time with the doctors during these visits. In addition, with the availability of access to an overwhelming volume of new medical literature, consumers are more motivated to research health concerns on their own (Davis, Palda, Drazin, & Rogers, 2006; Tai-Seale, McGuire & Zhang, 2007; Tu, 2008). There also is evidence to support consumers seeking health care information as a solace or a peer-counseling and advice resource (Fox 2014). Seeking PHC does not have to be limited to seeking information for oneself. This desire for well-being can also apply as a change agent in the lives of others (Fox & Rainee, 2000).

Knowing who is accessing what resources is important. One of the largest populations in the US is the baby boomer population (born from 1964 and prior to 1946). As this group is quickly moving into the retirement age, their medical care needs are also increasing, and this will have great implications for health care marketers (Thomas, 2005). Since the 1980s the US has seen a drop in hospital occupancy rates with a shift towards an increase in clinic use (Evans, 2015). Similarly, the trend in Taiwan (having had health insurance for 20 years) is to be expected to follow in the US. The impact on our health care system and reliance on clinics will drastically increase (Wu, Majeed & Kuo, 2010). One method to alleviate this is to increase the use of preventive health care by increasing access and use of PHCI. By analyzing what demographic characteristics determine which sources of PHCI are used, we can better target this aging demographic and decrease the load on the healthcare system by increasing PHC and wellness.

There are a multitude of sources that people might use when seeking PHCI. If it is possible to identify what sources are the most prominently used, by which people and for what reasons, then healthcare marketers can leverage these relationships (Quek, 2014; Thomas, 2005; Tully, 1995). This paper analyzes 27 sources of PHCI and seven demographic characteristics of these Taiwanese baby-boomers to determine where we may find predictors of where they seek health care information.

BACKGROUND

There are a variety of healthcare systems around the world. Some of these have no health insurance, others like the US are increasingly moving to a more centralized healthcare system where a significant majority of the populace now has health insurance and health care. In Taiwan essentially everyone has health insurance (WHO, 2010). All Taiwanese are covered by a government medical system but persons living in Taiwan who are not citizens are not covered. As the US changes to a system of health insurance more like Taiwan where almost all people have insurance, the demand on the health care system may also increase as Taiwan's did. Thus, examining PHC in Taiwan will give us more insights of PHC among Taiwanese. Some lessons can be learned for US to limit this load on the health care system.

Although there are many articles on PHC behaviors in both the United States and Taiwan, little research in PHCI could be found in Taiwan. Taiwan has had a national health insurance (NHI) system since 1995. All citizens must join the NHI except prisoners and people who have moved out of Taiwan making the coverage rate around 99%. Their use of the healthcare system is quite frequent with an average rate of 14 outpatient visits per person per year. The increased use has had a negative impact on the quality of outpatient visits with doctors seeing approximately 50 patients every morning (Wu, Majeed, & Kuo, 2010). This also addresses the importance of PHC among Taiwanese. People in Taiwan, healthy or sick, are likely to seek health information before or after they visit doctors.

Life expectancy at birth in Taiwan is very similar to those in the US with the life expectancy for men at 77.1 (US) versus 76.7 (Taiwan) and 81.9 (US) versus 83.2 (Taiwan) for women (Das & Samarasekera, 2012; Taiwan Statistic Bureau, 2016, table 29). This makes Taiwan an appropriate country to compare to what the US might encounter once the Affordable Care Act is established.

The senior population (older than 65 years old) has been growing fast in Taiwan. In 2017, it will be 14% of the total population (NDC, 2016). It is estimated, that by 2025 it will reach 20% implying there is one senior citizen among every five Taiwanese. In addition, there is currently a low birth rate, compounding the impact of the aging of baby boomer generation who are entering their retirement age in Taiwan. In the next two decades, even more of this age group will enter retirement. Examining PHC by focusing on baby boomers, then, has a significant impact on the health quality and financial burden of the health system in Taiwan.

Internet use and connection has increased dramatically for the past ten years. According to the Taiwanese Government (Zhang, Laivi, & Zhuang, 2010), 90% of consumers are able to access the web at home. More than 80% of the population who are 50 years old or older are able to get access online. It is obvious that Taiwanese are able to obtain services, conduct activities and consume goods online. The internet has become one of the important media that people depend upon in Taiwanese daily life. To compare PHC access among traditional printed materials, mass media, and internet will also be part of important goals of this study.

Sources of information used by the previous elder generations and baby boomers are very different (Williamson, et al., 2006.) Even though baby boomers did not grow up with computers, they have had and currently have opportunities to access computers somewhat during their work. Moreover, baby boomers achieve relatively higher educational levels and are able to and willing to learn how to use computers and web technology (Smith & Clurman, 1998; Wicks, 2004; Williamson, et al., 2006). Analyzing sources of prevention health care information and demographic factors associated with them will make substantial impacts to the wellbeing of seniors in Taiwan.

Some studies have shown that the consumption of health services increases with age (Thomas, 2009). As the baby boomer generation (born from 1964 to 1946) grows closer and closer towards retirement their health costs will continue to increase. One of the areas of increased attention in reducing health costs that can be implemented in a wide spread fashion for this generation is the use of health information to lower health care spending (Jamal, 2009). Understanding the concerns and practices of this age group can allow the healthcare industry to better influence them and potentially drive health care costs and health care risks down.

Sources

There are numerous sources of PHCI. Which of these sources are the most effective in promoting PHC behaviors and how these vary by different demographics have been studied in the US by many researchers (Redmond et al., 2010; Tully, 1995). This research is relatively new in Taiwan (Yen, Kung, & Tsai, 2014).

Traditionally, researchers study PHC sources from two different perspectives. The first one is the source of the PHC information. Most people will seek information from such medical professionals as physicians, nurses, dentists, and pharmacists. Some seek information from experts that could be dietitians, nutritionists, trainers, counselors, or other advisory professionals. Sometimes, parents, children, spouses, friends, neighbors or co-workers can also be good sources of PHC. Additionally, the government, employers, or hospitals, provide good PHC to people. For more discussion, please review Baker et al., 2003; Cangelosi et al., 2010a; Fox, 2014; Redmond et al., 2010.

The second perspective focuses on the channels. A variety of channels of PHC are discussed in different research papers. For instance, PHC could be in printed materials (brochures and pamphlets); via mass media (newspaper, radio, and TV); audio-video disks, tapes, or online; face-to-face communication; internet and social media; or currently via mobile devices. In this research, we try to cover a wide range of PHC channels that deliver PHCI to Taiwanese.

The internet is often a prime source of PHCI (Baker, Wagner, Singer, & Bundorf, 2003), although Fox and Rainie (1999) report that it is more so used for a tool for the sick than for prevention. A new phrase (e-patient) has been coined for the adult who seeks health information online. People who are looking for information for themselves will seek this out prior to (and not in lieu of) a doctor's visit. When seeking information for a loved one, others are likely to go online after a doctor's visit to gain additional information than to seek this before the doctor's visit (Fox, 2009).

Other sources include obtaining advice from peers (Fox, 2011). This can be in the form of social media outlets (Direct Marketing News, 2011), blogs or peer support groups. The type of information sought out from these sources are quite different than that sought from other sources. As one might think social outlets are sought out for emotional support, changing needs for the chronic health concerns and living with long-term management of illnesses (Fox, 2014).

In addition to these sources, consumers are also still relying on a variety of both formal or informal sources, such as shopping malls, supermarkets and health fairs (Mueller, 1989). They also rely on both personal contact with friends, family, neighbors and work associates. Equally important, people get access to PHCI from professional contact with physicians or other health professionals (Dutta-Bergman, 2005; Satcher & Higginbotham, 2008). This does not exclude more traditional sources of information such as newspapers, magazines and print media. Not to be overlooked are sources such as television and radio (Thomas, 2005).

In this study, we consider 27 sources of PHCI which include the internet, peers, social media outlets, seminars, hospitals, wellness centers, a variety of print media and publications as well as radio, TV and newspapers.

Factors

In the literature, many researchers consider background factors from the following perspectives: demographics (mostly, age, gender, marital status, and education), socio-economic status (income and employment), health status and history of family health, and environment factor (mostly rural or urban) (Baker et al., 2003; Cheah, 2012; Yen, et al., 2014). In this research, we will consider gender, age, marital status, education, employment, and income. We did not include the environment factor (rural or urban) as all respondants come from Taiwan which is an urban center. We also did not include health status or family history as papers that contain those demographics predominately focus on health whereas we wanted to focus on the sources of PHCI.

Many of the recent studies consider different demographics in not only their use but also trust of different sources of PHCI (Clayman, Manganello, Viswanath, Hesse & Arora, 2010). In addition, the promotion of PHC is deemed to also eliminate disparities in health among racial, ethnic, disability and socioeconomic groups (Satcher & Higginbotham, 2008; and Yen, Kung, & Tsai, 2014). Not only are we interested in knowing if their relationships are consistent in Taiwan as are findings in the US, but if they remain true when limited to the baby-boomer population. The following six factors are considered in this study.

Gender. Women are more likely to use or seek PHCI than are men (Cangelosi, Ranelli, & Voss, 2009; Fox & Rainie, 1999; Macias, Lewis, & Shankar, 2004). They are also more likely to seek information for others. In addition to simply seeking out PHCI, women are also more likely to look for information about treatment of an illness/disease than are men (Fox & Rainie, 1999; Tu & Cohen, 2008). It is argued that women are more likely to seek and use PHCI than their counterparts.

Age. This research is focused on baby boomers - a group of the 50 or older generation. The research shows that older people are relatively less likely to seek PHCI themselves due to many reasons, including physical and mental ability, educational background, as well as computer illiteracy the studies are conflicted over the seeking behavior compared to other age groups. It is not clear if as age increases so does the likelihood to seek PHCI. Some research shows this is true (Cangelosi, Ranelli, & Markham, 2009; Cangelosi & Markham, 1994). Some researches show that age and PHCI seeking behavior is a non-linear relationship. For instance, Weaver et al. (2010) found that aged 35-54 are the group most likely to seeking online health information regarding of their illness or wellness. However, other research (Tu & Cohen, 2008) shows that seeking PHCI is growing (2001 to 2007), but older Americans still fall behind younger Americans – especially with the 65+ consumers. Thus, it is logical to predict that age will have an impact on PHCI seeking behaviors among baby boomers in Taiwan but predicting a negative or positive impact is questionable.

Marital Status. It has been consistently found that being married increases the likelihood of using PHC. Those who are married also have better health habits and experience that result in less illness and stress (Cangelosi & Markham, 1994; Cheah, 2013; Thomas, 2005). We believe this phenomenon also applies to Taiwan and many other countries and thus, being married is hypothesized to have a positive impact on usage of PHCI.

Educational attainment. Both Thomas (2005) and Cangelosi and Markham (1994) showed that those with higher educational attainment have an increased tendency to seek PHCI. The higher educated also tend to use the internet more for PHCI (Cheah, 2013; Diaz et al., 2002). On the other end of the educational spectrum, having a low educational background is inversely related to the probability of using preventive medical care (Cheah 2013; Tu, 2008). By using this logic and related references, we predict that education has a positive impact on PHCI among Taiwanese.

Employment. In the US, employment is often tied to an increased availability of health care insurance policies or at least employment often provides for a reduced co-payment when seeking health care. However, the availability of health care has also shown a decrease in use of PHC which has a direct impact on the increased use of health care (Anderko et al, 2012; Benjamin, 2011). Employment for Taiwanese has more meaning from a socio-economic status viewpoint. For those who are currently employed, they are more likely to have better education and better financial resources. People with employment are more likely to be proactive in PHCI seeking in Taiwan.

Income. Cangelosi and Markham (1994) found that those with higher incomes were more likely to use PHCI. They also tended to use the internet more for PHCI (Diaz et al., 2002). Those with higher incomes also had an increased likelihood of using preventive medical care (Cheah, 2013; Tu, 2008). In addition, Nayga (2000) found that those with higher income were more likely to apply nutritional labeling information. This reasoning from US studies should also apply for Taiwanese. We predict that income has a positive impact on PHCI seeking in this study.

METHODOLOGY

This survey was conducted in late 2014 and 2015. The purpose of the research was to examine health information needs of baby boomers (aged 50 or older) in Taiwan. A total of 390 people completed the survey in Taipei City or New Taipei City, Taiwan. However, not all people answered all questions leaving us with 368 listwise responses (where every response was answered).

In this study we asked our 390 participants to identify themselves using all six of these demographic characteristics. Since most studies consider a wider array of ages than were in our study (50 to 68) we thought this may not show a significant impact, but we chose to include it.
This survey is a follow-up survey from a similar survey conducted in the United States. The original survey was written in English and translated to Chinese (Mandarin) for survey implementation and then back into English for analysis. Before we conducted the survey in Taiwan, a small scale (about 25 cases) pilot survey was conducted among some professionals and some baby boomers. A few questions were modified to adjust to the lifestyle of Taiwanese. Data was double entrered and compared. To ensure reliability, this study relied on a previous survey and translated this into Chinese and back into English. Two different persons reviewed this translation process to ensure accuracy of the instrument and results. To ensure validity, we combined some categorical groups to prevent small sample sizes in these groups. The details of how we did this are explained in the analysis.

The six demographic characteristics (gender, age, marital status, education, employment and income) of the survey respondents were summarized and analyzed first. Necessary grouping were made to avoid too few cases in certain categories. This was followed by an analysis of the 27 absolute responses to the survey questions on PHCI. Then a factor analysis was conducted on these PHCI. Finally, ANOVA was conducted to compare and examine relationships between and among demographic factors and four different CFV's.

ANALYSIS

Demographics

The demographics considered in this study included: gender (male/female), age (50 to 68), marital status, educational attainment, employment status and income.

Gender. This study used only two responses for gender (male/female). Sixty-two percent (242) of the respondents were female and 38% (148) were male. This is a reasonable representation of baby boomers in the US as there are slightly more women (54%) than men in the 50+ age brackets (Census, 2010). Most respondents were randomly selected from group activities in different locations among elder populations. Since females are relatively more active in participating in group exercises and activities, it is logical that more females participated in this study. Proportionally more females in this survey is one potential limitation of this research.

Age. Age was captured in whole number increments. The respondent ages followed a fairly Normal skewed right distribution with a mode of 60. After looking at the entire distribution of ages we chose to group the ages into three groups (50-54, 55-60 and 60+) in order to use this in our ANOVA and to avoid potential reliability problems associated with too few cases in certain categories. This roughly divided the sample into thirds. Thirty-three percent (128) of the respondends were in the lower age bracket, 35% (137) in the middle bracket and 32% (125) in the largest bracket.

Marital status. Although we collected demographics on seven different relationship status categories (divorced, married, partnership/cohabitating, remarried, separated, single never married and widowed), after realizing that eighty-one percent of respondents (317) were currently married, we decided to reduce the categories. In order to use this in our ANOVA and to avoid potential reliability problems associated with too few cases in certain categories, we grouped the respondents into married or not married. There were 81% (317) married and 19% (73) not married respondents. There did not appear to be any relationship with gender, age, education attainment, employment or income.

Education attainment. As is seen in the US, the higher the educational attainment, the more representation of men. Whereas men are only 38% of the surveyed respondents, they make up half of the college degree and above respondents. In order to use this in our ANOVA and to avoid potential reliability problems associated with too few cases in certain categories, we grouped the respondents into three groups. The first two categories of less than high school and high school degree/GED & vocational/technical degrees were combined to better mirror the educational levels in Taiwan. The next category consisted solely of the associates degrees. Lastly, those with a college

degree of bachelors or above were combined. Although this is not typical of how degrees are combined in the US, it is a better alignment with those in Taiwan. The result was 41% (159) in the lowest educational group, 23% (88) in the middle group, and 37% (143) in the highest educational group.

Employment. Typically, baby boomers are defined as those born between 1946 and 1964. Resulting a range of age range of 52 to 70. The official retirement age in Taiwan is 65. It is also common for many women to not have full time employment because their primary roles are taking care of family members. In this survey, we included full-time employment, part-time employment, home-makers, unemployed and retirement categories. Of these, only twenty-one percent (21%; 83 total) were retired while 61% (236) were still working. As anticipated, employment generally declined with age. In order to use this in our ANOVA, to avoid potential reliability problems associated with too few cases in certain categories, to provide an approximately equal distribution for our analysis and of the potential time and income impacts from employment, we chose to combine the two employment categories into one category and all others into another category for our research. The result was 61% (236) of the respondents were in the employeed category and the remaining 39% (154) were grouped in a category of not employed.

Income. In this survey we collected income in ranges beginning with less than 30,000 NTD and in 15,000 incremental brackets until 90,000 NTD. The exchange rate between US dollars and NTD varies. It is reasonable to use 30 as a benchmark for the exchange rate. If we use 30 as exchange rate, it is clear that we have four income categories that has US dollars of less than 1,000; 1,000 to 1,500; 1,500 to 2,000 and 2,000 and above monthly income in US dollars). As with the US population we would expect to see men making more money than women and this is true with this population. The final three income ranges had an ever decreasing number of respondents. In order to use this in our ANOVA and to avoid potential reliability problems associated with too few cases in certain categories, we grouped the respondents into one range to improve the ability to obtain significant results due to sample size. This gave us four categories with 42% (163), 23% (89), 19% (73) and 17% (65) responses each.

PHCI Absolutes: Mean values & frequencies (responses)

Respondents were asked to rate the importance of 27 options when searching for health information. They were asked to rate these on a scale from one to four with one being very unimportant, two being somewhat unimportant, three being somewhat important and four being very important. The larger in magnitude their response indicates the more important that option is for them. Table 1 shows the rank, count, average and standard deviation summary of their responses for all of these 27 options. It is listed from the largest average score to smallest. Using a scale of one to four, a mid-point score would be 2.5. All but the last five options had a mean above 2.5 indicating a propensity towards these sources for seeing health information being more important than not.

Table 1. Rank and Means of Different PHCI for Taiwanese

Rank	PHCI Sources	N	Mean	Std. Deviation
1	Television	390	3.187	0.719
2	Health Pamphlets (Print)	388	3.057	0.738
3	Hospital. Provided Information(Print)	389	3.054	0.763
4	Health. Related Newspapers (Print)	389	3.046	0.724
5	Health. Related/Newsletters Nutrition Books/Magazines (Print)	388	3.003	0.779
6	Health Videos	389	2.974	0.773
7	Nutrition Labels(Print)	387	2.961	0.769
8	Medical Journal(Print)	388	2.920	0.830
9	Public Health Service Publications(Print)	387	2.920	0.812
10	Health Insurance Provider Publications(Print)	387	2.912	0.822
11	Public Health Service Publications(Internet)	387	2.899	0.853
12	Health Association Publications (Print)	388	2.897	0.784
13	Health Insurance Provider Website (Internet)	387	2.881	0.871
14	Medical Encyclopedias (Print)	389	2.879	0.833
15	Hospital Website (Internet)	389	2.871	0.882
16	Wellness Center Information (Print)	387	2.863	0.795
17	Radio	387	2.801	0.851
18	Internet WEB MD (Internet)	387	2.793	0.807
19	Online Health Forums (Internet)	387	2.791	0.827
20	Wiki Health Dictionaries (Internet)	387	2.685	0.833
21	Health Fairs Information (Print)	388	2.680	0.811
22	Search Engines -- Yahoo, Google, Bing, etc. (Internet)	388	2.637	0.850
23	Health. Related Blogs (Internet)	388	2.397	0.815
24	Employer. Provided Information(Print)	381	2.396	0.763
25	Employer. Provided Information on Website (Internet)	388	2.356	0.776
26	Facebook (Internet)	387	2.354	0.806
27	TWITTER (Internet)	385	2.216	0.782
	Valid N (listwise)	368		

Television ranks the most important of the sources of health information. Direct medical and health related materials in print format were also found to be import PHCI for Taiwanese. It appeared that Taiwanese care more about the title and/or content of materials, i.e., direct medical or health related, instead of format, in print or internet.

In fact, when looking at those options of least importance, internet sources compose the bottom three sources as well as eight of the bottom ten sources. It implies that Taiwanese are still relatively less likely to use social media as a major way of obtaining PHCI. PHCI provided by employers was also found to be very low (with ranks of 24 and 25). Similar to internet, search engines and blogs were also ranked low in terms of usage of PHCI among Taiwanese.

Overall, it is clear that TV and print information sources are the primary sources of health information for this population. Relatively, internet is not as popular as TV and print materials as major channels of PHCI. TV and newspaper are more popular than radio if we compare mass media channels.

Another consideration with these results is that the survey was not a required response option survey. It allowed respondents to not answer all questions. This can be noted in the fact that only one of the 27 options had all 390 respondents answer it. In all the other cases there were at least one respondent who chose not to answer.

Differences (Factor Analysis)

A factor analysis was conducted using SPSS to assess differences in any of the factors concerning one's health seeking behavior. The factors considered answered the question: which of the following media is more important when you search for health information?

The initial results from this analysis showed a Kaiser-Meyer-Olkin measure very close to one and Chi-Square analysis with a significance close to 0 indicating that our survey data was a good candidate for factor (or principal component) analysis. When running the factor analysis components one through four all showed eigen values greater than one which supported using these four CFVs. This four component model accounts for almost 66% of the total variance as seen in Table 2's cumulative percent. In addition the scree plot (Figure 1) supports the four component factor model as the slope of the remaining variables after the fourth has relatively little remaining changes in slope.

Table 2. Total Varience Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.691	47.002	47.002	9.112	33.749	33.749
2	2.086	7.726	54.728	3.803	14.085	47.834
3	1.761	6.521	61.249	2.621	9.707	57.541
4	1.172	4.34	65.589	2.173	8.048	65.589

Figure 1. Scree Plot
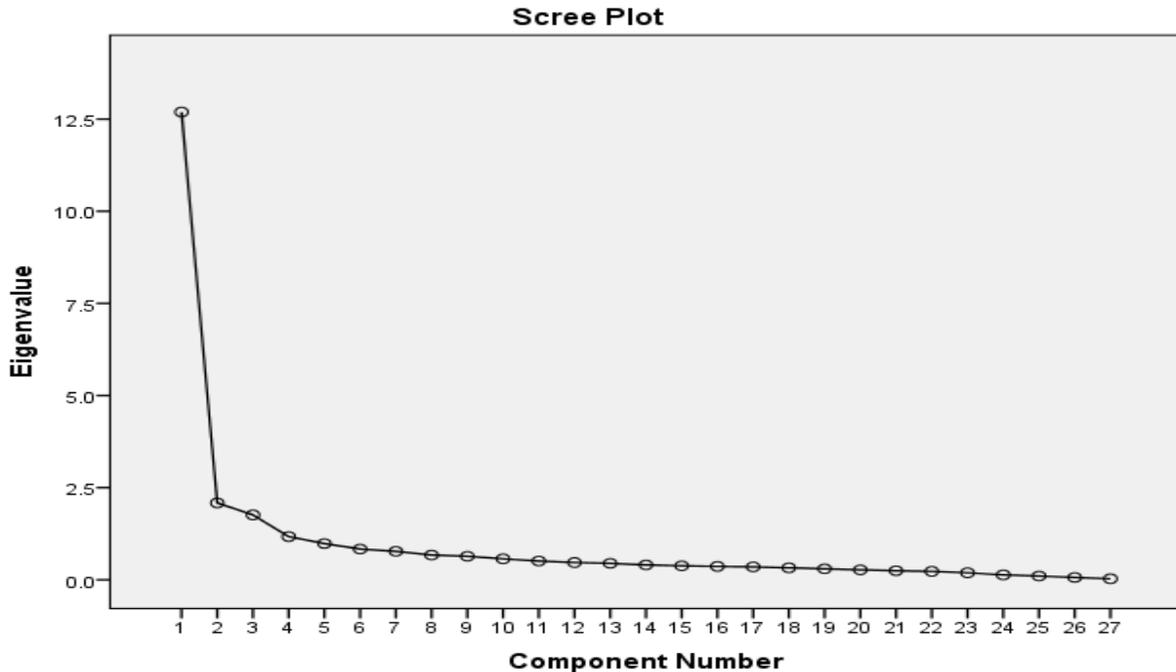
Each PHCI delivery system (which maps to our questions) was thus broken out into these four CFVs. The rotated component matrix from SPSS shows each of the PHCI delivery systems factor loadings. Here you can see each system and which CFV it loaded most strongly on, grouped into the four CFVs in Table 3. These are referred to in this paper as the four CFVs (CFV1 through 4). These four categories and their corresponding categories are listed below with the total number of variables for each factor in parentheses to the right.

1. Health and medical directly related materials (most in print and few on internet) by health professionals or institutions (15)
2. PHCI via social networking, online health forums, or health videos (6)
3. Employer website/printed health information and internet browsers (3)
4. PHCI via mass media such as TV, radio and print newspapers (3)

Although CFV4 only has three sources, it has the highest average importance rating and mean value. In Taiwan, most of baby boomers obtain their PHCI via different mass media, i.e. television, newspapers and radio. The second ranking is CFV1, that includes most health and medical direct related materials, mostly in printed format with a few in web format. Taiwanese read those materials produced by health professionals and institutions. They will read them mostly in print or sometimes via internet. CFV2 is the third important media and includes mostly internet and social media. It is clear that internet is the third important PHCI channels in Taiwan. On the other spectrum, CFV3, also with three sources, has the lowest importance average and mean value. It means that least Taiwanese obtain PHCI from employers or search engines.

Table 3 is presented in such a manner as to facilitate the understanding of the output by grouping the variables comprising each component together. The order in which the variables were entered

into the factor analysis is indicated by the number at the beginning of the variable description. Orthogonal is a concept indicating that two or more factors are independent, hence, not correlated with each other. The varimax rotation is an orthogonal type rotation that simplifies the factors, such that some factors correlate either quite strongly and others more weakly. Of the 27 variables, only two of the variables has cross-products exceeding 0.4 (3-health videos; 17-wiki health dictionaries), besides the primary component score, indicating quite a bit of independence and distinctiveness between the four components (Meyers, Gamst, & Guarino, 2013).

Table 3. Varimax Rotated Component Matrix

PHCI Delivery Systems	1	2	3	4
q15.10-Public Health Service Publications(Print)	0.864	0.124	0.216	0.037
q15.12-Health Insurance Provider Publications(Print)	0.855	0.131	0.224	0.020
q15.11-Public Health Service Publications(Internet)	0.812	0.279	0.252	-0.049
q15.19-Medical Journal(Print)	0.798	0.272	0.090	0.055
q15.13-Health Insurance Provider Website (Internet)	0.777	0.270	0.290	-0.076
q15.25-Hospital-Provided Information(Print)	0.769	0.076	0.162	0.190
q15.18-Health Association Publications (Print)	0.769	0.221	0.131	0.156
q15.9-Medical Encyclopedias (Print)	0.700	0.368	0.040	-0.039
q15.26-Hospital Website (Internet)	0.693	0.183	0.416	0.058
q15.22-Wellness Center Information (Print)	0.692	0.118	0.196	0.211
q15.20-Nutrition Labels(Print)	0.692	0.157	0.040	0.321
q15.8-Health Pamphlets(Print)	0.681	0.365	-0.065	0.201
q15.21-Internet WEB MD (Internet)	0.655	0.220	0.200	0.143
q15.24-Health Fairs Information (Print)	0.622	0.363	0.316	0.107
q15.14-Health-Related/Newsletters Nutrition Books/Magazines (Print)	0.594	0.068	0.238	0.253
q15.7-Health-Related Blogs (Internet)	0.244	0.781	0.106	0.018
q15.15-TWITTER (Internet)	0.064	0.700	0.287	0.068
q15.4-Online Health Forums (Internet)	0.358	0.698	0.066	0.099
q15.23-Facebook (Internet)	0.087	0.665	0.329	0.074
q15.3-Health Videos	0.452	0.566	-0.005	0.207
q15.17-Wiki Health Dictionaries (Internet)	0.455	0.547	0.237	0.067
q15.28-Employer-Provided Information on Website (Internet)	0.326	0.280	0.787	0.244
q15.27-Employer-Provided Information(Print)	0.343	0.202	0.751	0.285
q15.29-Search Engines -- Yahoo, Google, Bing, etc. (Internet)	0.251	0.351	0.636	-0.005
q15.1-Television	-0.037	0.013	0.017	0.846
q15.16-Health-Related Newspapers (Print)	0.243	0.027	0.137	0.708
q15.2-Radio	0.182	0.272	0.201	0.621

Having looked at the demographics, sources and now used factor analysis to group these into four CFVs, we took a close look at the relationships between the demographics and sources using an ANOVA.

ANOVA

These resulting four CFVs were analyzed using ANOVA for each of the demographic variables to identify if any differences in these demographics were noted. A complete table of the four CFVs and variables is provided in Table 4. Table 4 reveals that out of 24 measurements, there were only eight whose significance was less than 0.05 across various groupings for the demographic variables.

Details of the significant relationships are detailed in Table 5. Notice that for the demographic variables age and marital status, the level of signifance is between 0.05 and 0.10. We recognize that the significance level is set based on the individual application and that some research sets this level at 0.05 whereas others allow 0.10 and rarely above 0.10. To allow a full display of the results, we chose to show any results below 0.10 in our analysis in Table 5. In addition, traditionally, in U.S. studies, age and marital status have been significant indicators of being more or less PHC oriented (Cangelosi, Ranelli, and Kim, 2010). Had we set the acceptable level at 0.05 we would have failed to list age or marital status in our following summary table.

Table 4. CFVs and Demographic Variable Levels of Significance

	Age	Monthly Income	Marital Status	Educational Attainment	Employment Status	Gender
CFV1. Health-related Print Media, WebMD & Hospital Websites	0.297	0.004	0.226	0	0.208	0.04
CFV2. Health Videos, Social Networking, Wikis, online health forums	0.16	0.131	0.117	0	0.018	0.127
CFV3. Employer Print & Website Health Information, Internet Browsers	0.088	0.007	0.381	0	0.011	0.422
CFV4. TV, Radio, printed health newspapers	0.467	0.477	0.084	0.178	0.731	0.319

Table 5 reveals that the most significant differences were noted for those respondents who were better educated (bachelors or above) using the sources in CFV1, 2, and 3 with a significance of 0.000. The next most significant demographic characteristic was those with a higher monthly income (over 60,000 NTD). This demographic tended to use the sources in CFV1 (alpha = 0.004) and CFV3 (alpha = 0.007).

Table 5. Significant Differences among Demographic Groups for the CFVs

Demographic Variable	Significant CFV's	Greater PHC Orientation	Mean Scale Value	ANOVA F-Value	Probability of Insignificance
Age	CFV3. Employer Print & Website Health Information, Internet browsers	Younger (50-54)	2.56	2.447	0.088
Monthly Income	CFV1. Health-related Print Media, WebMD & Hospital Websites	Higher Income	3.14	4.604	0.004
	CFV3. Employer Print & Website Health Information, Internet browsers		2.65	4.092	0.007
Marital Status	CFV4. TV, Radio, printed health newspapers	Not married	3.12	3.001	0.084
Educational Attainment	CFV1. Health-related Print Media, WebMD & Hospital Websites	Better Educated	3.09	9.937	0
	CFV2. Health Videos, Social Networking, Wikis, online health forums		2.69	5.625	0.004
	CFV3. Employer Print & Website Health Information, Internet Browsers		2.58	11.154	0
Employment Status	CFV2. Health Videos, Social Networking, Wikis, online health forums	Employed	2.62	5.689	0.018
	CFV3. Employer Print & Website Health Information, Internet Browsers		2.53	6.575	0.011
Gender	CFV1. Health-related Print Media, WebMD & Hospital Websites	Female	2.97	4.235	0.04
Scale: 1=very unimportant, 2=somewhat unimportant, 3=somewhat important, 4=very important					
NOTE: higher mean values indicate a greater PHC orientation.					

Gender was found to be statistical significant for CFV1. It implies that if we focus on print materials, it more likely that Taiwanese females will read the materials than Taiwanese males. Gender did not affect PHCI behaviors in other channels, i.e., TV, newspaper, radio, employer related, or internet.

Age, in general, does not affect PHCI seeking among Taiwanese, except employer related PHCI, i.e. CFV3 in this case. It was found that younger baby boomers are more likely to seek PHCI via employer provided information and using search engines. One of the reason could be that younger baby boomers are likely to work and easily influenced and impacted by PHCI provided by their employers. Younger baby boomers are also more likely to use search engines to conduct their own search.

According to literature, married people are more likely to seek PHCI. In this study, it was found that unmarried baby boomers are more like to seek CFV4, e.g. television, newspaper, and radio. It gives policy makers and researchers a very interesting recommendation. The best way to reach unmarried baby boomers regarding to PHCI in Taiwan is to use traditional mass media.

The most significant differences were noted for those respondents who were better educated (bachelors or above) using the sources in CFV1, 2, and 3 with confidence levels of almost 100% significance differences exist across the particular demographic categories (i.e. probabilities of insignificance of 0.000 and 0.004). It is interesting to find out that education is not a significant factor regarding to mass media and PHCI seeking. Education is a significant contributing factor regarding obtaining PHCI from print materials, internet, and employer provided information.

Employment status is found to affect PHCI provided by employers or in internet, to be specific, CFV2 (internet) and CFV3 (employers and search engines). Employment is statistically not difference in print PHCI or PHCI provided by mass media.

Monthly income is statistically significant on CFV1 and CFV3. To be specific, higher income Taiwanese are more likely to read print materials and PHCI provided by employers or search engines.

These results can best be summarized by looking at each of the CFVs and apply the significant demographics. Hence, Table 6 showing the four CFVs, their means and the significant demographics.

Table 6. Composite factored variables and significant demographics

	Composite Factored Variables	Mean	Significant Demographics
CFV1	Health and medical directly related materials (most in print and few on internet) by health professionals or institutions (15)	2.92	More importance: females; better educated and with higher income.
CFV2	PHCI via social networking, online health forums, or health videos (6)	2.57	More importance: better educated and employed.
CFV3	Employer website or printed health information and internet browsers (3)	2.47	More importance: younger (50-54); better educated; employed; and higher income.
CFV4	PHCI via mass media such as TV, radio and print newspapers (3)	3.01	More importance: not married.

CONCLUSION/FUTURE RESEARCH

The prominent differences noted in the conclusions from this research from previous studies conducted in the US are potentially due to the population being restricted to baby boomers. Whereas a majority of studies found differences in age with the older age brackets, this one did not – it indicated the younger bracket has increased PHCI seeking. The younger bracket in the study is the 50-54 age group which is often one of the older bracket in other studies. That said, younger baby boomers are more likely to be an active PHCI seeker.

Also whereas in the US employment is associated with increased health insurance, increase use of health care and a decrease in PHCI seeking, this study showed being employed resulted in an increase of PHCI. Which may be due to the practically unanimous health insurance coverage of

the population in Taiwan. Employment may mean more opportunity, better resources, or more peer influences among colleagues in Taiwan. Thus, employment was found to be positively associated with PHCI via internet or by employers.

It did show differences with being female, better educated, and having higher income which is consistent with the majority of studies conducted in the US.

In sum, we can conclude from this research is that the tendency in Taiwan matches what we expect to see in the US with women, better educated and higher income respondents having a greater use of CFV1. The better educated and employed having a greater use of CFV2. The younger, better educated, employed with higher incomes using CFV3 more. One major difference is for CFV4. The only status that showed more use of CFV4 were the unmarried. We believe this may be unique for this baby-boomer demographic as the care trait that is associated with seeking PHCI and is related to being married or having health care responsibilities for others is also related to having had children. With the older demographic, their marital status may no longer be the driving force as having had children/having health care responsibilities for others may be a larger driving force.

Future research should include questions in health condition and family health history. The rural or urban setting is also found to be statistically significant in many previous studies but was not included in this study. The heavier proportion of females in the study was another limitation of this study. Such demographic question as the care-giving responsibilities, specifically, has one had children or does have or ever had health care responsibilities for others (children, parents, etc.).

This study successfully identified four major types of PHCI in Taiwan, specifically, via print, the internet, the employer and traditional mass media. Major demographic and socio-economic correlates (i.e., gender, age, marital status, education attainment, employment status and monthly income). Relationships among demographic information and PHCI were also examined and discussed. Most results were consistent with US studies. Some minor deviation from US studies were discussed. Hopefully, this research can make contribution to the existing literature and contributing to PHCI and reduction of health cost in Taiwan as well as in the US.

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